

ABSTRACT

A downhole crystal-based clock that is substantially insensitive to the factors that may cause frequency deviation as a result of downhole temperature. The clock may include a plurality of crystals, where a first crystal may be more stable, with respect to temperature, than a second crystal. The crystals may be thermally coupled together so that they may have substantially the same temperature. An error detector may monitor the differences between the frequencies associated with each crystal and provide this information to a storage device. This information may be determined prior to deploying the clock downhole. When deployed downhole, the signal from the error detector may be interpreted in light of the information in the storage device to provide a temperature measurement of the two crystals. The downhole temperature measurement then may be used to reduce frequency deviations in the downhole clock that may result from downhole temperatures.